Final

Site-Specific Field Sampling Plan, Site-Specific Safety and Health Plan, and Site-Specific Unexploded Ordnance Safety Plan Attachments Ranges at Iron Mountain Road and Ranges at Bains Gap Road

Skeet Range, Parcel 69(Q)
Range 19, Parcel 75(Q)
Range 13, Parcel 71(Q)
Range 12, Parcel 70(Q)

Range 21, Parcel 77(Q)
Range 22, Parcel 78(Q)
Range 27, Parcel 85(Q)

Fort McClellan
Calhoun County, Alabama

Task Order CK11
Contract No. DACA21-96-D-0018
IT Project No. 800486

August 2001

Revision 0

Final

Site-Specific Field Sampling Plan Attachment
Ranges at Iron Mountain Road and
Ranges at Bains Gap Road

Skeet Range, Parcel 69(Q)
Range 19, Parcel 75(Q)
Range 13, Parcel 71(Q)
Range 12, Parcel 70(Q)

Range 21, Parcel 77(Q)
Range 22, Parcel 78(Q)
Range 27, Parcel 85(Q)

Fort McClellan
Calhoun County, Alabama

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Table of Contents

Page

Table of Contents (Continued)

Page

Table of Contents *(Continued)*

Page

List of Tables

List of Tables (Continued)

List of Figures

List of Acronyms

See Attachment 1, List of Abbreviations and Acronyms.

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK11, IT Corporation (IT) will conduct range sampling activities at the Ranges at Iron Mountain Road and the Ranges at Bains Gap Road, Parcels 69(Q), 75(Q), 71(Q), 70(Q), 77(Q), 78(Q), and 85(Q), at Fort McClellan (FTMC), in Calhoun County, Alabama, to determine the presence or absence of potential site-specific chemicals at this site. The purpose of this site-specific field sampling plan (SFSP) is to provide technical guidance for sampling activities at the Ranges at Iron Mountain Road and the Ranges at Bains Gap Road.

The Ranges at Iron Mountain Road are comprised of the Skeet Range, Parcel 69(Q), Range 19, Parcel 75(Q), Range 13, Parcel 71(Q), and Range 12, Parcel 70(Q). All four range sites are located east of Iron Mountain Road and south of Summerall Gate Road in the southwest area of the FTMC Main Post. The main range boundary is formed by Sunset Hill and Baltzell Hill, located to the east. Several small tributary streams meet in this area to form Remount Creek, which flows north to Cane Creek. Figure 1-1 shows the four Iron Mountain Road ranges.

The ranges at Bains Gap Road are comprised of three ranges which are adjacent to each other and are located directly south of Bains Gap Road in the east-central section of the FTMC Main Post. An unnamed hill separates the Bains Gap Road ranges from Range 20, which is located to the south. The north slope of the unnamed hill (which faces the Bains Gap Road ranges) is heavily vegetated. Jones Hill and Marcheta Hill (both approximately 1,300 feet above mean sea level) are situated north and east of the ranges, effectively enclosing the ranges in the floor of a shallow valley. Eight small tributary streams flow from the surrounding hillsides to meet in this area and form Cane Creek. Cane Creek flows west from the Bains Gap Road range area towards the central area of the Main Post. Figure 1-1 shows the three Bains Gap Road ranges.

The Iron Mountain Road and Bains Gap Road ranges are among the best documented and understood of all FTMC sites. All were used as firing ranges for small arms. The locations of the firing lines, impact areas, berms, and safety fans are known with relative certainty, which logically defines the limits of potentially contaminated areas. Lead is likely to be the most widespread of the potential contaminants.

IT will collect 10 surface soil, 5 surface water/sediment, 22 groundwater, and 80 surface soil screening x-ray fluorescence (XRF) samples at the ranges. Chemical analyses of the surface soil

and surface water/sediment samples collected during the field program will include volatile organic compounds (VOC), semivolatile organic compounds (SVOC), target analyte list (TAL) metals, nitroexplosives, cyanide, organophosphorous pesticides, chlorinated pesticides, herbicides, perchlorate, polychlorinated biphenyls, total organic carbon (sediment only), and grain size (sediment only). Chemical analyses of the groundwater samples collected during the field program will include VOC, SVOC, TAL metals, nitroexplosives, and perchlorate. Results from these analyses will be compared with site-specific screening levels and ecological screening values presented in the IT July 2000 *Final Human Health and Ecological Screening Values and PAH Background Summary Report* and regulatory agency guidelines.

UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at the Ranges at Iron Mountain Road and the Ranges at Bains Gap Road. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purpose of UXO avoidance.

This SFSP attachment to the installation-wide sampling and analysis plan (SAP) for the Ranges at Iron Mountain Road and the Ranges at Bains Gap Road, will be used in conjunction with the site-specific safety and health plan, the site-specific UXO safety plan, the installation-wide work plan, and the SAP. The SAP includes the installation-wide safety and health plan, waste management plan, ordnance and explosives management plan, and quality assurance plan. Site-specific hazard analyses are included in the site-specific safety and health plan and the site-specific UXO safety plan.

1.0 Project Description

1.1 Introduction

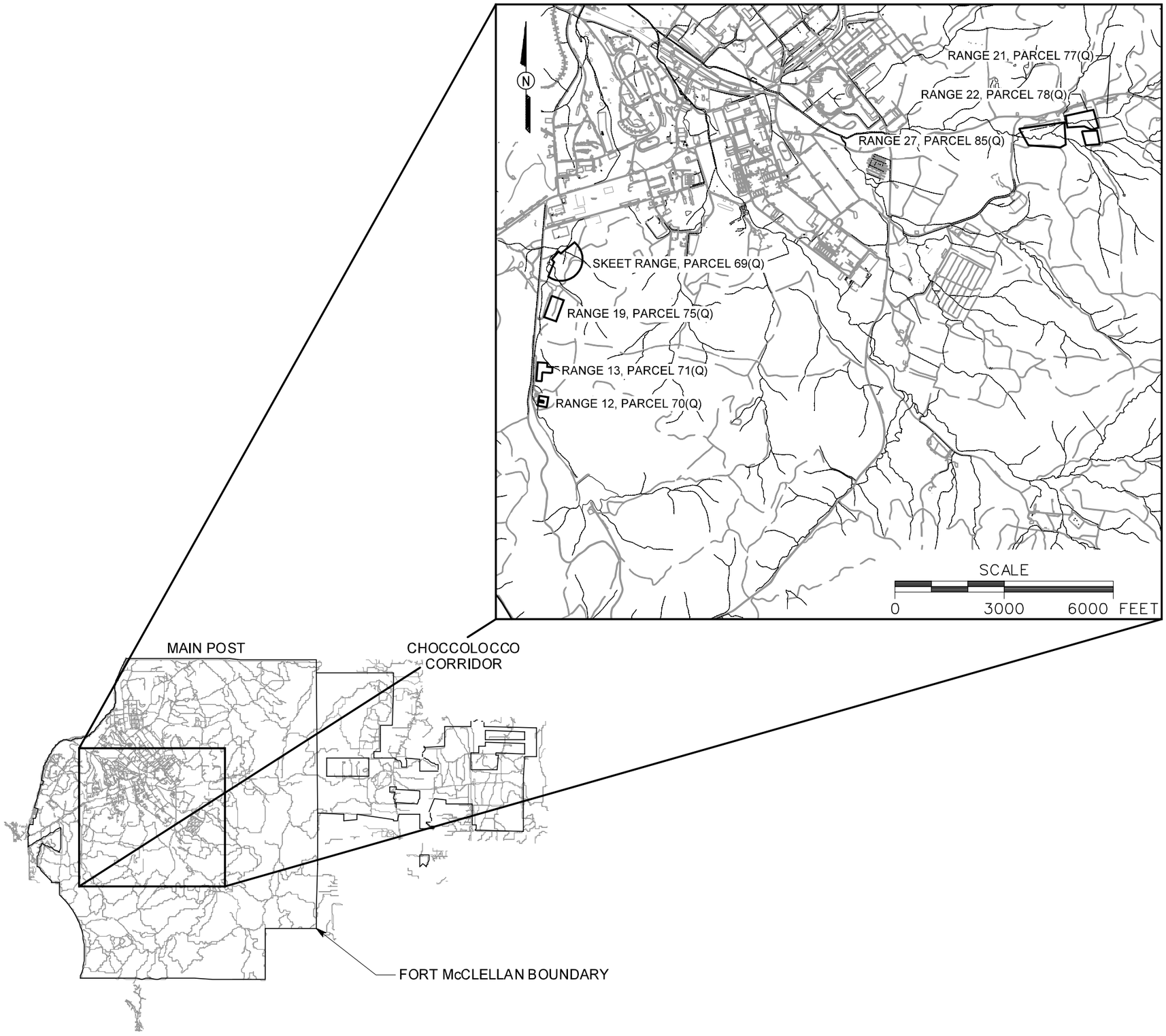
The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the range sampling of the Ranges at Iron Mountain Road and the Ranges at Bains Gap Road, Parcels 69(Q), 75(Q), 71(Q), 70(Q), 77(Q), 78(Q), and 85(Q), Delivery Order CK11, Contract Number DACA21-96-D-0018.

This site-specific field sampling plan (SFSP) attachment to the installation-wide sampling and analysis plan (SAP) (IT, 2000a) for FTMC has been prepared to provide technical guidance for sample collection and analysis at the Ranges at Iron Mountain Road and the Ranges at Bains Gap Road. The activities presented in this SFSP were discussed and approved during the June 27, 2001 Base Realignment and Closure Cleanup team (BCT) site visit to each range. This SFSP will be used in conjunction with the site-specific safety and health plan (SSHP); the site-specific unexploded ordnance (UXO) safety plan developed for the Ranges at Iron Mountain Road and the Ranges at Bains Gap Road; the installation-wide work plan (WP) (IT, 1998), and SAP. The SAP includes the installation-wide safety and health plan (SHP), waste management plan, ordnance and explosives management plan, and quality assurance plan (QAP). Site-specific hazard analyses are included in the SSHP and the site-specific UXO safety plan.

1.2 Site Description

Iron Mountain Road Ranges. The Ranges at Iron Mountain Road are comprised of the Skeet Range, Parcel 69(Q), Range 19, Parcel 75(Q), Range 13, Parcel 71(Q), and Range 12, Parcel 70(Q). All four range sites are located east of Iron Mountain Road and south of Summerall Gate Road in the southwest area of the FTMC Main Post. The main range boundary is formed by Sunset Hill and Baltzell Hill, located to the east. Several small tributary streams meet in this area to form Remount Creek, which flows north to Cane Creek. Figure 1-1 shows the four Iron Mountain Road ranges.

Bains Gap Road Ranges. All three ranges in this area are adjacent to each other and are located directly south of Bains Gap Road in the east-central section of the FTMC Main Post. An unnamed hill separates the Bains Gap Road ranges from Range 20, which is located to the south.



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- IMPACT ZONE
- SURFACE DRAINAGE / CREEK

FIGURE 1-1
SITE LOCATION MAP
IRON MOUNTAIN ROAD AND
BAINS GAP ROAD RANGES

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

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STARTING DATE: 07/02/01
DRAWN BY: D. BOMAR
DATE LAST REV.:
DRAWN BY:
DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: J. BOND
PROJ. MGR.: J. YACOUB
DWG. NO.: ...\800486es.019
PROJ. NO.: 800486

The north slope of the unnamed hill (which faces the Bains Gap Road ranges) is heavily vegetated. Jones Hill and Marcheta Hill (both approximately 1,300 feet above mean sea level) are situated north and east of the ranges, effectively enclosing the ranges in the floor of a shallow valley. Eight small tributary streams flow from the surrounding hillsides to meet in this area and form Cane Creek. Cane Creek flows west from the Bains Gap Road range area towards the central area of the Main Post. Figure 1-1 shows the three Bains Gap Road ranges.

The Iron Mountain Road and Bains Gap Road ranges are among the best documented and understood of all FTMC sites. All were used as firing ranges for small arms. The locations of the firing lines, impact areas, berms, and safety fans are known with relative certainty, which logically defines the limits of potentially contaminated areas.

The Iron Mountain Road and Bains Gap Road ranges, along with the proposed field activities are described in detail in the following sections of this SFSP.

1.3 Scope of Work

The scope of work for activities associated with the range sampling at the Ranges at Iron Mountain Road and the Ranges at Bains Gap Road, as specified by the statement of work (USACE, 1999), includes the following tasks:

- Develop the SFSP attachment.
- Develop the SSHP attachment.
- Conduct a surface and near-surface UXO survey over all areas to be included in the sampling effort.
- Provide downhole UXO support for all drilling to determine buried downhole hazards.
- Collect 10 surface soil, 5 surface water/sediment, 22 groundwater, and 80 surface soil screening x-ray fluorescence (XRF) samples at the ranges to determine whether potential site-specific chemicals (PSSC) are present at the Ranges at Iron Mountain Road and the Ranges at Bains Gap Road, and to provide data useful for supporting any future corrective measures and closure activities.
- Analyze samples for the parameters listed in Section 4.5 of this SFSP for each individual range.

The proposed work is to be conducted to fill data gaps identified in the Screening Level Ecological Risk Assessment (SLERA).

UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at this site. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purpose of UXO avoidance. The site-specific UXO safety plan will be used to support sample collection activities at the Ranges at Iron Mountain Road and the Ranges at Bains Gap Road, if incidental ordnance, explosives, and UXO are encountered and require avoidance.

At completion of the field activities and sample analysis, draft and final reports will be prepared to summarize the results of the activities, to evaluate the absence or presence of PSSCs at this site, and to recommend further actions, if appropriate. Range sampling reports will be prepared in accordance with current U.S. Environmental Protection Agency (EPA) Region IV, and the Alabama Department of Environmental Management (ADEM) guidelines.

2.0 Summary of Existing Environmental Studies

An EBS was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with U.S. Department of Defense guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by the following seven criteria:

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas)

2. Areas where only release or disposal of petroleum products has occurred

3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response

4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken

5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken

6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented

7. Areas that are not evaluated or require further evaluation.

For non-Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) environmental or safety issues, the parcel label includes the following components: a unique non-CERCLA issue number, the letter "Q" designating the parcel as a Community Environmental Response Facilitation Act (CERFA) Category 1 Qualified Parcel, and the code for the specific non-CERCLA issue(s) present (ESE, 1998). The non-CERCLA issue codes used are:

- A = Asbestos (in buildings)
- L = Lead-based paint (in buildings)
- P = Polychlorinated biphenyls
- R = Radon (in buildings)
- RD = Radionuclides/radiological issues

- X = UXO
- CWM = Chemical warfare material.

The Ranges at Iron Mountain Road and the Ranges at Bains Gap Road were classified with a unique non-CERCLA issue number, followed by the letter "Q." The "Q" designates the parcel as a CERFA Category 1 Qualified Parcel. Category 1 sites are areas where no storage, release, or disposal (including migration) has occurred.

The EBS was conducted in accordance with the CERFA protocols (CERFA-Public Law 102-426) and U.S. Department of Defense policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, EPA Region IV, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

In 2000, IT conducted site investigation activities in support of an Engineering Evaluation and Cost Analysis (EE/CA) report. The data from this investigation indicated contamination from lead was present in soil at the ranges. The information for the Iron Mountain Road Ranges is presented in a September 2000 Draft Final report entitled *Engineering Evaluation and Cost Analysis for the Ranges at Iron Mountain Road.* The data for the Bains Gap Ranges has not yet been presented in a report; however, it has been summarized in a document entitled *Summary of the Ranges at Iron Mountain Road, the Ranges at Bains Gap Road, and the Historical Ranges on Main Post* issued by IT for the Independent Technical Review Meeting, Fort McClellan, Calhoun County, Alabama, November 8-9, 2000.

3.0 Field Activities

3.1 UXO Survey Requirements and Utility Clearances

IT will conduct UXO avoidance activities at all the ranges, including surface sweeps and downhole surveys of soil borings.

3.1.1 Surface UXO Survey

A UXO sweep will be conducted over areas that will be included in the sampling and surveying activities to identify UXO on or near the surface that may present a hazard to on-site workers during field activities. Low-sensitivity magnetometers will be used to locate surface and shallow-buried metal objects. UXO located on the surface will be identified and conspicuously marked for easy avoidance. Subsurface metallic anomalies will not be disturbed, but will be marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in Chapter 4.0 and Appendices D and E of the approved SAP (IT, 2000a).

3.1.2 Downhole UXO Survey

During the drilling for the installation of permanent monitoring wells, downhole UXO surveys will be performed to determine if buried metallic objects are present. UXO monitoring, as described in Chapter 4.0 of the SAP (IT, 2000a), will continue until undisturbed soils are encountered or the borehole has been advanced to 12 feet below ground surface (bgs), whichever is reached first.

3.1.3 Utility Clearances

After the UXO surface survey has cleared the area to be sampled and prior to performing any drilling, a utility clearance will be performed using the procedures outlined in Section 4.2.6 of the SAP (IT, 2000a). The site manager will mark the proposed locations with stakes, coordinate with the local utility companies to clear the proposed locations for utilities, and obtain digging permits. Once the locations are approved (for both UXO and utility avoidance) for intrusive sampling, the stakes will be labeled as cleared.

3.2 Environmental Sampling

The environmental sampling program at the Ranges at Iron Mountain Road and Bains Gap Road, includes the collection of surface soil, surface water/sediment, and groundwater samples for

chemical analysis. These samples will be collected and analyzed to provide data for characterizing the ranges. In addition, XRF samples will be collected to provide lead data for the range safety fans.

3.2.1 Surface Soil Sampling

Surface soil samples will be collected from the locations specified in the following sections for each Range.

3.2.1.1 Sample Collection

Surface soil samples will be collected from the upper 1 foot of soil by either direct-push methodology or hand-auger methodology, as specified in Section 4.7.1.1 and Section 4.9.1.1, respectively of the SAP (IT, 2000a). Collected soil samples will be screened using a photoionization detector (PID) in accordance with Section 4.15 of the SAP. Surface soil samples will be screened for information purposes only, not to aid in the selection of samples for analysis. The samples will be collected from areas that represent "worst case scenarios", where contamination would be expected to be the most severe. This may include the berm faces. Prior to sample collection, bullets and bullet fragments will be cleared from the area to be sampled.

Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. Sample documentation and chain-of-custody (COC) will be recorded as specified in Section 4.13 of the SAP. The samples will be analyzed for the parameters listed in Section 3.5 of this SFSP.

3.2.2 Permanent Residuum Monitoring Wells

Permanent residuum monitoring wells will be installed at each range. The permanent monitoring well locations are specified in the following sections for each range. Final monitoring well locations will be determined in the field by the on-site geologist, based on actual field observations and utility and UXO clearance results. The residuum monitoring well boreholes will be drilled to the top of bedrock, or until adequate groundwater is encountered to install a well with a 10- to 20-foot screen. Monitoring wells will be installed using a truck-mounted or all-terrain-vehicle-mounted hollow-stem auger drill rig. The monitoring well casing will consist of new 2-inch inside-diameter, Schedule 40, threaded, flush-joint, polyvinyl chloride (PVC) pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap PVC well screen, approximately 10 to 20 feet long. The well will be installed so the well screen intersects the water table.

Soil samples will be collected continuously to 12 feet bgs and at 5-foot intervals thereafter during hollow-stem auger drilling. Lithologic samples will be collected and described to provide a detailed lithologic log. The samples will be collected for lithology using a 24-inch-long, 2-inch-or-larger-diameter, split-spoon sampler. The soil borings will be logged in accordance with American Society for Testing and Materials (ASTM) Method D 2488 using the Unified Soil Classification System (USCS). All soil samples will be screened in the field for the presence of volatile organic compound (VOC) contamination utilizing a PID. Soil samples will not be collected for laboratory analysis. The monitoring wells will be drilled, installed, and developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000a). Groundwater samples will not be collected from residuum wells for a period of at least 14 days after well development.

3.2.3 Permanent Bedrock Monitoring Wells

The bedrock monitoring wells will be drilled using a combination of hollow-stem auger wireline coring, and air rotary drilling techniques. It is estimated that the bedrock monitoring wells will be installed to an approximate depth of 100 feet bgs; however, actual depths may vary, based on ground elevation and lithology observed from the borehole. The permanent monitoring well locations are specified in the following sections for each range.

Boreholes will first be advanced using hollow-stem auger drilling and split spoon sampling. Subsurface soil samples will be collected using hollow-stem auger drilling equipment and a 2-inch diameter split spoon sampler (in accordance with ASTM Method D 1586) as specified in Section 4.7.1.2 of the SAP.

Soil samples will be collected continuously to 12 feet bgs and at 5-foot intervals thereafter during hollow-stem auger drilling. Lithologic samples will be collected and described to provide a detailed lithologic log. The soil samples will be logged in accordance with ASTM Method D 2488 using the USCS. All soil samples will be screened in the field for the presence of VOC contamination utilizing a PID. Soil samples will not be collected for laboratory analysis.

Upon reaching auger refusal, continuous bedrock coring will be performed in accordance with ASTM Method D 2113, Standard Practice for Diamond Core Drilling for Site Investigation (1993). Bedrock coring will be performed with a PQ size wireline triple-tube core barrel with a 10-foot longitudinally-split inner tube to collect core samples continuously from split spoon refusal to 5 feet below auger refusal.

Bedrock cores will be described to provide a detailed lithologic log in accordance with methods outlined in the U.S. Army Corps of Engineers, South Atlantic Division, Manual DM 1110-1-1 (July, 1983). Structural features such as folding, fracturing, and brecciation (which may indicate the presence of faulting) will be noted.

After auger refusal, an air rotary rig with a 12-inch percussion bit or rotary bit will be used to ream the borehole from ground surface to the depth of auger refusal. Nominal 8-inch carbon steel International Pipe Standard outer casing will then be installed into the borehole from ground surface to the bottom of the borehole. A minimum 2-inch annular space between the outer casing and the borehole wall will be required. The 8-inch carbon steel outer casing will be grouted in-place using a tremie pipe suspended in the annulus outside of the outer casing. Bentonite-cement grout will be mixed using approximately 6.5 to 7 gallons of water, and 5 pounds of bentonite per 94 pound bag of Type I Portland cement. After the grout has cured a minimum of 48 hours, a PQ wireline core barrel will be used to collect continuous bedrock core and to advance the borehole to the target depth. The depth into competent bedrock will be increased if groundwater is not encountered. After completion of core sample collection, a 7-7/8-inch air percussion bit will be used to ream the hole from the bottom of the surface casing to the borehole target depth. The compressor on the drill rig will be equipped with an air filter between the compressor and the drill bit.

At the completion of each boring, four-inch diameter monitoring wells will be installed inside the outer casing at each proposed bedrock well location. The well casing will consist of new, 4-inch inside diameter (ID), Schedule 80, threaded, flush-joint, PVC pipe. Attached to the bottom of the well casing will be a section of new, threaded, flush joint 0.010-inch continuous wrap PVC well screen approximately 10 feet long. At the discretion of the IT Site Manager, an approximately 3- to 5-foot long sump, composed of new, 4-inch ID, Schedule 80, threaded, flush-joint PVC pipe may be attached to the bottom of the well screen. After the casing and screen materials are lowered into the boring, a filter pack will be installed around the well screen. The filter pack will be tremied into place from the bottom of the sump to approximately 5 feet above the top of the screen. The filter pack will consist of 20/40 silica sand. A fine sand seal (30/65 silica sand), approximately 5 feet thick, will be placed above the filter pack. A bentonite seal will be placed above the filter pack and will extend from the top of the fine sand seal to approximately 5 feet above the bottom of the outer casing. The remaining annular space will be grouted with a bentonite-cement mixture (described above) and tremied in place with a side discharge tremie from the top of the bentonite seal to ground surface. The monitoring wells will

be drilled, installed, and developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000a). Groundwater samples will not be collected from bedrock wells for a period of at least 14 days after well development.

3.2.4 Groundwater Sampling

Groundwater samples will be collected from the monitoring wells completed at each range.

3.2.4.1 Sample Collection

Prior to sampling monitoring wells, static water level will be measured in each monitoring well. Water level measurements will be performed as outlined in Section 4.18 of the SAP (IT, 2000a). Groundwater samples will be collected in accordance with the procedures outlined in Section 4.9.1.4 of the SAP.

Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP (IT, 2000a). The samples will be analyzed for the parameters listed in Section 3.5 of this SFSP.

3.2.5 Surface Water Sampling

Surface water samples will be collected from the area of the Ranges at Iron Mountain Road and Bains Gap Road. At the Ranges at Iron Mountain Road, the surface water samples will be collected from Remount Creek (and/or its tributaries). At the Ranges at Bains Gap Road, the surface water samples will be collected from Cane Creek (and/or its tributaries). The specific sampling locations are described in detail in the following sections for each creek (presented in this SFSP).

3.2.5.1 Sample Collection

The surface water samples will be collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP (IT, 2000a). Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. The samples will be analyzed for the parameters listed in Section 3.5 of this SFSP.

3.2.6 Sediment Sampling

Sediment samples will be collected from the area of the Ranges at Iron Mountain Road and Bains Gap Road. The sediment samples will be collected at the same locations as the surface water samples described in Section 3.2.5.

3.2.6.1 Sample Collection

The sediment samples will be collected in accordance with the procedures specified in Section 4.9.1.2 of the SAP. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. The sediment samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

3.2.7 XRF Sampling

XRF samples will be collected in situ from multiple locations within the range safety fans of the Ranges at Iron Mountain Road and Bains Gap Road. The purpose of the XRF sampling will be to analyze the surface soils within the range safety fans for the presence of lead.

3.2.7.1 Sample Collection

The XRF samples will be collected in accordance with the procedures specified in this section Section 4.6 of the SAP. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. The XRF samples will be analyzed for the parameters listed in Section 3.5 of this SFSP.

To perform this phase of the investigation, metals analysis will be completed onsite using an energy-dispersive portable XRF instrument. Site soil surface areas will be prepared and analyzed in situ according to the methodology specified in Section 3.2.7.2 of this SFSP. Although the XRF instrument will measure and record a number of metals present in the sample, lead has been selected as the primary indicator element of contamination from range use. XRF analysis provides screening-level data.

XRF measurements involve exposing the sample to a series of x-rays generated by radioactive sources stored within the instrument. Qualitative and quantitative data are generated by measuring the wavelength and frequency of the fluorescence of the metallic elements present in the sample. The fluorescence is a function of the x-ray strength and length of exposure during analysis. These data are captured and interpreted using an onboard data processor, then reported for manual recording in terms of concentration and standard deviation via the display screen. If

possible, data will also be electronically downloaded into spreadsheet-compatible files from the instrument for electronic management and reporting. The manufacturer's directions for instrument calibration, operation, and maintenance shall be followed explicitly. Select samples will be measured in duplicate to assess analytical precision.

3.2.7.2 In situ Preparation and Measurement

Prior to the measurement, the analyst will perform the daily instrument calibration checks and will enter into the XRF data logger a data label that will correspond to the sample number/location of the measurement. In situ measurements will be conducted by the XRF analyst placing the instrument probe in direct contact with the soil. In situ measurements will be performed on areas where the soil has been prepared. This preparation will include the following steps:

- A visual assessment to ensure the soil is not wet (if the location is wet, an alternate sample location will be selected)
- A removal of rocks, vegetative material, and bullet fragments from the surface using a trowel or spoon
- Thorough surficial mixing to break up the compacted soil
- Hand tamping the soil into a small, compacted dome with a level surface for probe interface.

When a compacted, level surface is achieved, the probe is then placed onto the prepared surface and is checked for consistency of contact and the analysis initiated. When the measurement is complete, the analyst will record the XRF result manually on the XRF soil sample collection log. The XRF instrument data logger will also record the analytical result associated with the sample location identity in its internal memory. This process will be repeated to gather data for all identified locations. At the end of the sampling day (or before), the data will be transferred from the data logger to the analyst's computer for storage and reporting. To assess precision, multiple readings will be periodically performed at the same location by repeating the analysis process.

3.2.7.3 Quality Assurance

During XRF calibration, the analyst will perform measurements on a blank matrix (Teflon or quartz) and on two standard reference materials (SRMs) purchased from the National Institute of Standards and Technology (NIST). SRM 2586 has a certified concentration of 432 mg/kg lead

and SRM 2711 has a certified concentration of 1,162 mg/kg. Successful calibration of the instrument will be based on a non-detected value for lead on the blank matrix sample while achieving a relative percent difference (RPD) of less than 25% for the SRMs measured concentrations compared to their certified values for lead. Calibrations will be performed at the beginning and end of each day's analysis. Calibration checks consisting of SRM 2586 analysis will also be performed after every 20th field measurement to verify accuracy.

In addition to the accuracy check of the calibration, the XRF instrument will be used to periodically measure the same location in duplicate to assess analytical precision. This check will be performed once for every 20 field measurements at the discretion of the XRF analyst.

Confirmatory surface soil samples will be collected and submitted for laboratory analysis by EPA Method 6010B for lead. If the XRF instrument indicates locations with a high concentration of lead, the confirmatory surface soil samples will be collected from these locations. The confirmatory surface soil samples will be collected at a frequency of 10 percent. There are a total of 80 XRF sample locations proposed. Therefore, there will be a total of eight confirmatory soil samples collected.

3.2.7.4 Data Management

The XRF analyst will be responsible for manually recording the results of the instrument calibration and the results of each field measurement using the XRF calibration forms and the XRF soil sample collection log form. In addition to these forms, the instrument will record the measurements electronically in the XRF data logger during analysis. At least once per day (following each day's analysis), the analyst will download the electronic data onto a laptop computer for management and reporting.

3.3 Decontamination Requirements

Decontamination will be performed on sampling and nonsampling equipment to prevent cross-contamination between sampling locations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.1 of the SAP (IT, 2000a). Decontamination of nonsampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.2 of the SAP.

3.4 Surveying of Sample Locations

All areas at the ranges must be cleared for UXO avoidance before any surveying activities will commence. Sampling locations will be marked with pin flags, stakes, and/or flagging and will be surveyed using either global positioning system (GPS) or conventional civil survey techniques, as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum, 1983. Elevations will be referenced to the North American Vertical Datum of 1988.

Horizontal coordinates for soil sample locations will be recorded using a GPS to provide accuracy to within 1 meter. Because of the need to use permanent monitoring wells to determine water levels, a higher level of accuracy is required. Monitoring wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques as required. Procedures to be used for GPS surveying are described in Section 4.3 of the SAP. Conventional land survey requirements are presented in Section 4.19 of the SAP.

3.5 Analytical Program

Samples collected at locations specified in this SFSP will be analyzed for specific suites of chemicals and elements based on the history of site usage, as well as EPA, ADEM, FTMC, and USACE requirements.

Target analyses for surface soil and surface water/sediment samples collected from the Ranges at Iron Mountain Road and Bains Gap Road will consist of the following list of analytical suites:

- Target Compound List (TCL) Volatile Organic Compounds (VOC) – Method 5035/8260B
- TCL Semivolatile Organic Compounds (SVOC) – Method 8270C
- Target Analyte List (TAL) Metals – Method 6010B/7000
- Nitroexplosives – Method 8330
- Cyanide – Method 9012B
- Organophosphorous Pesticides – Method 8141A
- Chlorinated Pesticides – Method 8081A
- Herbicides – Method 8151A
- Perchlorate – Method 314
- Polychlorinated Biphenyls (PCB) – Method 8082
- Total Organic Carbon – Method 9060 (sediment only)
- Grain Size – ASTM 421/422 (sediment only).

Target analyses for groundwater samples collected from the monitoring wells to be installed at the Ranges at Iron Mountain Road and Bains Gap Road will consist of the following list of analytical suites:

- TCL VOCs – Method 5035/8260B
- TCL SVOCs – Method 8270C
- TAL Metals – Method 6010B/7000
- Nitroexplosives – Method 8330
- Perchlorate – Method 314.

Target analysis for confirmatory surface soil samples collected from the range fans at Ranges at Iron Mountain Road and Bains Gap Road will consist of the following list of analytical suite:

- Total Lead – Method 6010B.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as specified in the following sections of this SFSP for each range and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with Corps of Engineers–South Atlantic Savannah Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms and electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

3.6 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping will follow the procedures specified in Section 4.13.2 of the SAP (IT, 2000a). Completed analysis request/COC records will be secured and included with each shipment of coolers to:

Attn: Elizabeth McIntyre
EMAX Laboratories, Inc.
1835 205th Street
Torrance, California 90501
Telephone: (310) 618-8889.

3.7 Investigation-Derived Waste Management

Management and disposal of the investigation-derived wastes (IDW) will follow procedures and requirements as described in Appendix D of the SAP (IT, 2000a). The IDW generated at the Ranges at Iron Mountain Road and Bains Gap Road is expected to include decontamination fluids, direct-push and hollow-stem auger cuttings, purge water from wells, and disposable personal protective equipment. The IDW will be staged in the fenced area surrounding Buildings 335 and 336 while awaiting final disposal.

3.8 Site-Specific Safety and Health

Health and safety requirements for the range sampling are provided in the SSHP attachment for the Ranges at Iron Mountain Road and Bains Gap Road. The SSHP attachment will be used in conjunction with the installation-wide SHP.